DOCUMENT RESUME

ED 217 197 CE 032 729

AUTHOR Feldman, Marvin
TITLE Vocational Education in the Future.
PUB DATE 82
NOTE 10p.; Paper presented at the Annual Conference of the National Research Coordinating Unit (17th, Las Vegas, NV, April 1, 1982).

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Automation; Computers; *Educational Change; Educational Needs; *Educational Trends; Employment Patterns; *Futures (of Society); Labor Needs; Productivity; School Business Relationship; *Social Change; *Technological Advancement; *Vocational Education; Work Attitudes
IDENTIFIERS *Self Employment

ABSTRACT

The technological revolution and a related revolutionary rethinking of the right relationship of people to work will have profound implications for the spirit and content of vocational education. Rapid industrial growth, particularly in the areas of computers and robotics, will undoubtedly increase demands for technical education and professional continuing education of highly schooled mid-career adults. Other forces for educational change are the recent trend towards decentralization of industry and society's return to being home-centered. These two factors have resulted in a reversal of the declining trend of self-employment. Society's new information intensiveness and the continued development of electronic means for handling information have enhanced the trend toward increased self-employment. In light of these changes, vocational educators must work with industry to see how they can produce the increased number of entrepreneurial workers that will be necessary in the future. (MN)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
✓ This document has been reproduced as received from the person or organization originating it.
Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official N.I.E. position or policy.

PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
Marvin Feldman
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC).

ED217197

National Research
Coordinating Unit
17th Annual Conference
Las Vegas, Nevada
April 1, 1982

Marvin Feldman
President
Fashion Institute
of Technology
227 West 27th Street
New York, N. Y. 10001

"Vocational Education in the Future"

I've been asked to talk to you about the future. That, as you know, can be a hazardous business because, as someone said, we have no facts about the future--and never will.

Economic forecasters are lately in particular disrepute. President Carter used to say he knew a Georgia fortune teller who was a better forecaster than his White House economists. And recent history is littered with the shattered egos of seers whose confident visions of the future turned out to be magnificently wrong.

For example, Lord Rutherford, who is usually called the father of the nuclear age, said in 1922, "the energy produced by the breaking down of the atom is a poor kind of thing, anyone who expects a source of power from the transformation of these atoms is talking moonshine." When, during World War II, our Manhattan project scientists were working frantically to make an atom bomb before the Germans did, Admiral Leakey, then the Chief of Staff, said, "The bomb will never go off, and I speak as an expert on explosives."

"Space travel is utter bilge," said Britain's royal astronomer in 1956. "Flight by machines heavier than air is impractical and insignificant, if not utterly impossible," said a noted mathematician a few months before the Wright Brothers flew at Kitty Hawk.

Early in the development of the Xerox process, a high-powered research corporation concluded that electrostatic printing was a clumsy substitute for carbon paper and could never be sold in volume. A few years later the Xerox 914 Copier had become the most successful single product in history.

Not too long ago, one of the developers of computers said probably only about a dozen big companies would ever be able to put computers to use. But, in spite of the hazards, people go on making predictions. Some are so familiar as to seem inevitable; automated highways; molded garments; and zero pollution by 1990--that the desert will bloom under enormous plastic awnings: and that we will soon have electronic mail and voice-activated typewriters.

CE032729

Some predictions are merely frivolous: Marlon Brando will establish a new nation in the South Pacific; and we'll all soon be smoking safe cigarettes made of seaweed.

Many predictions are hair-raising: that there will be a shooting civil war in the United States for example; that Japan will sink into the sea; and that the world will be at war over famine or oil. I heard Admiral Rickover say on "Sixty Minutes" last week that a nuclear holocaust seems inevitable.

Some are exotic: creatures from outer space will come and live among us; and we will use psychic methods to enforce the law.

I'm not going to evaluate these predictions, but I am going to make some of my own, knowing full well that they may come back to haunt me. But I am much more optimistic.

Remember the sign, from a German university in the Twenties, "in case of rain, the revolution will take place in the hall." I think two related revolutions are right now spilling over into our halls, so close perhaps that we cannot see them very clearly. One is a technological revolution, which I think may in time have consequences which exceed that of the first, mechanical, phase of the industrial revolution--a gathering, post-industrial revolution, so to speak. The other is a related revolution in human consciousness--a re-thinking of the right relationship of people to work.

These two revolutions, I think, will tend to be mutually re-inforcing, and will transform society in ways most of us will applaud. And, of course, these twin revolutions have profound implications for the spirit and content of vocational education.

The technological revolution is perhaps the most familiar. Its basis will be the apparently imminent quantum increases in our ability to process and transmit information. And this has already become our largest industry.

Less than a century ago, most Americans were farmers. Then, as farmers drove off their farms in Henry Ford's Model T's, Most Americans were industrial workers. Then, as the post-industrial revolution gathered momentum, more and more of us became information handlers. By 1960, handling information had already become the most common American occupation. By 1970, most workers, more than half the work force were involved in it. Information had become our central resource, and we had become a nation of information handlers.

Now, happily, staggering productivity increases are taking place in this now-basic industry and even greater gains are in prospect. One computer expert illustrated the matter this way: "if the automobile industry had developed as fast as the computer industry since 1950," he said, "we'd be paying $2.50 for a Rolls Royce that would get two million miles to the gallon."

These advances are at least as important to an information-intensive society as, say, the introduction of electricity was to an industrial one. There were corresponding increases in the efficiency of the methods used to transmit information. Microwaves bounced off satellites now transmit staggering quantities of information almost instantaneously. These are as important in an information-intensive society as railroads or trucks were in transporting the raw materials and products of an industrial one. But there is much, much more to come.

One scientist has predicted that newly developed superconductors may multiply computer performance 10,000 more time by the mid-eighties. Fiber optic cable sends laser generated light waves over tiny glass fibers much more cheaply and efficiently than present methods. Cable television--the newest installations with as many as 105 channels--is already available to half the homes in the nation and half of these already subscribe.

The quickening pace of change is illustrated by television. It took eighty years for the telephone to be installed in 34 million homes and 62 years to get them wired for electricity. It took 49 years for all these households to get an automobile. Television made that stride in five years. Now there are more television sets in American households than telephones or refrigerators. There are more radios than people. Electronic meetings and the equivalent of electronic mail are not unusual. Soon they may be common.

Even the industrial sector of society is being transformed. At the frontier, robots have now clearly escaped the world of science fiction. More than a hundred firms are making more than 200 kinds of robots. Thousands are employed in plants around the world, with computers for brains, doing exactly the routine, repetitive, back-breaking job men and women like least. Some robots can "see" with camera eyes linked to memory systems and "feel" with sophisticated sensors. Tomorrow's robots will hear and obey spoken instructions.

The robot industry is exploding. In 1978, its sales totaled $35 million. In 1982, they will exceed $210 million--a sixfold increase in four years. It seems every week a new giant corporation announces its involvement in robotics: IBM, Westinghouse, General Electric, Bendix and, just last week, General Motors. At F.I.T., we have already had two conferences on robotics. The continued explosive growth of robotics is widely perceived as inevitable. General Electric has reduced it to a grim slogan. American industry has three choices: "automate, emigrate or evaporate."

The computer is the source of both the office and the factory revolutions. Together they will produce changes more profound than the first, mechanical phase of the industrial revolution. I mean that literally. Last Fall, in a special cover-story report, Business Week predicted that new forms of computer-assisted automation in plants and offices will alter elementally 45% of the nation's jobs in the next decade or two. In other words, 45 million people will have to be re-trained and the preparation of those entering the work force altered accordingly. To cite only one example, software engineers, the new aristocrats of the workplace, tell me that if they do not systematically up-date themselves every eighteen months, their skills become hopelessly obsolete.

This does not mean, as the Luddites among us forever contend, that there will be a reduced demand for work. On the contrary, technology is increasing the demand for manpower as it increases the productivity of manpower. But technology changes the people power mix. Robots--and the kind of technology robots represent--arithmetically reduce the need for the lowest skilled workers, but geometrically increase the need for technicians.

The industry my institution serves is a near-perfect example. The composition of its labor force is changing. The demand for technicians to tend increasingly complex technology--computer-directed lasers for cutting, sound waves sewing machines, programmed stitching machines and computer graphics will increase.

Technical education is, undoubtedly, a major growth industry, but as it grows it will change. The constituency it serves will change. It's content will continue to change. Lifetime, continuing education, was once just something we talked about to pass the heavy time at education conventions. Now it has become a reality for millions of Americans.

In what Daniel Bell years ago called a post-industrial society, employment--both for present and future employees--is requiring more and more education. The things uneducated people can do are being done by increasingly sophisticated machines. That means uneducated people are having to get educated to get and stay employable. We are preparing people for jobs none of us ever had! Our enrollments are going to continue to grow and adults will be the source of much of that growth. And I submit post-secondary vocational education will grow faster than any other sector.

Peter Drucker says, "the fastest growing industry in America today may be" (note that he does not say mini-computers or microwave transmitters or fiber optic cable or cable television or videorecords).... "The continuing professional education of highly schooled mid-career adults." And later, he continues, "above all, attention will shift back to schools and education as the central capital investment and infrastructure of a knowledge society." Education policy will need to examine 4 year - 2 year competence.

But consider some of the secondary implications of the post-industrial revolution. It may become much easier to take work to the people than to bring the people to work. In other words, we may not solve the problem of transportation in a mass society, we may simply by-pass it. (In fact, when you look back over America's history, you see how rarely we have solved our problems and how often we have simply outgrown them.) The industrial revolution brought headlong centralization. Huge cities pulled people to the center. Its social effect was centripetal. The post-industrial revolution will almost certainly be centrifugal, reinforcing an outward movement of society, physical decentralization, local and individual autonomy. Skyscrapers may someday soon be an anachronism. In fact, after more than a century during which more and more people left home--to work, to play, to learn--America is coming home again.

In what may be the most important social phenomenon of this century, we are rapidly becoming a home-centered society. It may be the salvation of a society that is showing disturbing signs of stress if not disintegration. After more than a century of centralization, reinforced by a generation of technology that seemed to draw people out of their homes first for work, then for education, recreation, health care--very nearly the whole range of human activities--we are bringing all these activities home again.

For the first time in a century and a half, small towns are growing faster than big cities. Calvin Beale, head of population research in the Agriculture Department and the leading authority on this phenomenon, says it began over ten years ago, in 1970. Rural growth was outrunning metropolitan growth for the first time since the census of 1820. This new trend has nothing to do with an agricultural renaissance. Employment in agriculture continues to decline as the mechanization of agriculture continues to increase. Industry is decentralizing, moving out of the cities and into the country. In Kansas, for example, 60 to 70% of the new plants are being built in towns of fewer than 50,000 people.

At about the same time, another elemental trend reversed itself. Self-Employment, which had been declining for more than a century, began to increase faster than conventional employment before the Civil War. The overwhelming majority of Americans worked for themselves. Then, with an almost frightening rapidity, the pattern shifted. People left their farms to work in factories, many of them driving Henry Ford's Model-T's (which he built in part because he hated farming so passionately).

And soon, America became not the nation of independent yoeman farmers Jefferson believed would keep us free, but a nation of employees. We crowded into cities: we crowded into factories. We made miracles of productivity, but part of the price was a heart-breaking agenda of public problems. But now that pattern is changing. Self-employment is increasing faster than conventional employment. People are becoming more independent, self-supervising--entrepreneurial.

There are two special twists to this trend toward self-employment. A disproportionate number of this new army of the self-employed are women, and a great many of them work at home. "Hundreds of thousands of women," reports the New York Times, "are choosing to work at home, finding their own surroundings a suitable, convenient and economical place for combining career and family responsibilities." The bureau of labor statistics counted 1.9 million self-employed women in 1977 (up from 1.4 million five years before) and there are probably at least twice as many and probably half of them work at home. This in fact many resolve the continual dilemma in home economics education--homemaking vs. career.

As the society becomes more information-intensive and as the electronic means for handling information becomes more and more cost-effective, people who work at great distances from each other can be linked electronically as easily as if they were in the same room. We no longer need to bring the people to work, in expensive, energy-consuming atmosphere polluting vehicles. We can bring the work to the people--electronically. It is cheaper, conserving of non-renewable resources, ecologically benign. And, most important, it offers the hope that some of the intractable social problems associated with industrialization and urbanization may now become more manageable.

There are dozens of other signs. People are learning at home, and as cable television brings almost unlimited channel capacities into our homes, there are new possibilities for home study, shopping from home, banking from home, investing from home. More and more children, according to John Holt, the maverick educational theorist, are being taught at home. More and more, the sick are being cared for at home. Every day's paper brings fresh evidence that we are involved in a great renaissance of the home-centered society. The baby boom generation, now in young adulthood, tell the pollsters that they want, above all, to have a home and stay there! Twenty-nine percent of homeowners say they plan to spend more time in home-centered activities this year than last. Retail garden centers report sales increases ranging from 25% to 100%. People are generating their own power at home, building their own homes. Needless to say, the implications of the homecoming of America are immense.

It may be that this dilemma that haunted Thomas Jefferson all his life may now, two centuries later, be finding a resolution. This month, we celebrate his birthday. Jefferson was fascinated by labor-saving machinery. Monticello is filled with marvelously inventive devices Jefferson designed to make things work better with less effort. He watched England's industrialization with deeply mixed feelings of fascination and apprehension. Jefferson believed that the fragile democratic institutions he and his colleagues had designed for America would only survive if the people were autonomous and independent--morally and practically self-sufficient. He dreaded the consequence of large numbers of people developing "habits of subordination," by dependence on others for the continuity of their employment. He could imagine a desirable, workable democracy of independent farmers. But he doubted that a mechanized, industrialized urbanized, centralized, highly supervised society could keep alive the values that would nourish a responsible democracy. To that end he doubted if industrialization, regardless of the fabulous material benefits, was worth the risk. But in the end, inevitably, the benefits of industrialization became irresistible, and Jefferson's apprehensions were redeemed.

The strain on democratic institutions was immense. We became the world's principal paradox--a nation in which, for the first time, ordinary people achieved levels of affluence that for centuries only a tiny upper layer of aristocrats had enjoyed. But we became a society with a discouraging agenda of seemingly intractable problems. We found we had built a society that was rich, but in other ways less and less satisfactory--and many decent people began to wonder whether American democracy would survive.

But now, there is a solid basis for optimism about America's future. It seems possible that we may retain the benefits of specialization and mechanization and avoid the dreadful side-effects. We begin to imagine a society based on high technology and a high degree of decentralization. No one can possibly predict the exact shape such a society will take. But it is clear that certain values that have been in the shadows for years in America may again become ascendant: independence, self-supervision, decentralization, autonomy, responsibility, self-sufficiency and community. That is the basis of another revolution, the revolution in our consciousness of right working relationships.

In the recent encyclical, "on human work," Pope John Paul II affirms a new possibility to re-define work, "industrial development," he writes, "provides grounds for re-proposing in new ways the question of human work." Several years ago, Norman Mac Rae, the remarkable Deputy Editor of the London Economist, began to outline these new possibilities. Mac Rae points out that since the turn of the century 40 out of 159 nations have grown rich because they are able--temporarily--to increase productivity by a top-down form of organization in which executives arranged how assembly line workers worked with their hands. But this era, he claims, is over. "Educated workers do not like to be organized from the top," he writes, "and much of manufacturing and most of simple white collar tasks can be gradually automated so that more workers can become brainworkers." And imagination, he points out, is a human quality that cannot so readily be organized from the top down.

Mac Rae sees large corporations evolving into "confederations of entrepreneurs." He believes, "many of the things that have been run by some disciplined process...will need to be made much more entrepreneurial." Just a few years ago, the head of a very large and successful oil company told a television interviewer: "the worst thing that can happen is to have an employee that doesn't fit. A corporation has to have regimentation in order to run."

Now, just a few years later, industry leaders are telling us something quite different. here's a quote from the head of a large company in the industry my institution serves: "We need people who are resourceful and imaginative, people who have the confidence and courage to act effectively and decisively on their own. "We don't want people who only do what they are told; we want people who do what they can't be told." So much for management!

So I think some powerful tendencies are converging. Technology is re-inforcing a welcome decentralization at a time when we are beginning to see the awful consequences of centralization. People are demanding emancipation from close supervision in work at a time when management styles built on proximity to workers are becoming technologically obsolete. Industry is asking for qualities of imagination, self-supervision, and resourcefulness--at the same time people seem to be reaching out for ways to express just these qualities in their work.

One sure sign of the importance of these developments is the mushrooming growth of centers and institutes concerned with rethinking the conventional terms of employment. A few years ago there were none. Now there are literally dozens. The implications of all this for vocational education are of course immense. If those of you in research don't blow it! The present surging demand for vocational education will almost surely continue. But we are going to have to gear what we do to the developing of new relationships in the workplace--find ways to nourish the imagination, autonomy, resourcefulness, the capacity for self-supervision.

For years, the Marxist critics of vocational education have accused us of conspiring with industry to "tame" their work force--to produce people who would come to work on time, do what they were told, keep their mouths shut and respect authority. We were supposed to condition people to regimentation. Whether or not we were guilty, perhaps we should now conspire with industry to see how we could change what we do to produce the more entrepreneurial workers they will need, more and more, in the future.

John Dewey, that unread and misunderstood genius of educational theory also wrote that a proper conception of industrial education would, "prize freedom more than docility, initiative more than automatic skill, insight and understanding more than the capacity to recite lessons or to execute tasks under the direction of others." Dewey was suggesting that we prepare young people to be self-supervising--entrepreneurial--whether on their own or inside larger organizations.

Yet we know surprisingly little about where entrepreneurs come from, what they are like, and how education might better nourish and instruct the entrepreneurial impulse. Shapero's studies suggest that entreprenueurs are often poor performers in school. Often, they are drop-outs. This clearly could mean that conventional educational programs are neglecting the nurture of the imagination.

In any case, the decades just ahead hold exciting times for vocational educators. John Baskin, in his splendid book, New Burlington, states, "I think we are all faced with two problems, and they are basic and countervailing: how to live honorably, and how to support an honorable life." I feel in my bones that in the post-industrial society these two basics may not be countervailing anymore. And we can all take part in helping that come to pass. Thank you.